

# Aeronautical Systems Center

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## Hexavalent Chromium Substitution Projects

Date (12 May 2011)

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# Report Documentation Page

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# Overview of Presentation

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- **Background**
- **Scope of WNV Efforts**
- **Current and Past Projects**
- **Pending Projects**
- **Lessons Learned**
- **Recommendations/Conclusions**

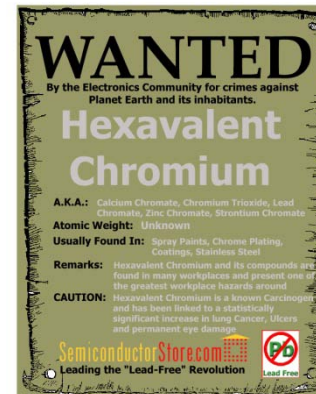


# Background



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- **RoHS – EU regulations on electronics products (MCV 0.1%)**
- **REACH – EU legislation is imposing restrictions on Cr<sup>6+</sup> use**
- **OSHA PEL reduction to 5 µg/m<sup>3</sup> (Feb 2006)**
- **Aerospace Industry Exemption to 25 µg/m<sup>3</sup>**





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# USD(AT&L) Memorandum



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- **Cr<sup>6+</sup> has international restrictions, which will increase LCC & decrease Cr<sup>6+</sup> availability**
- **Approve the use of alternatives when they perform adequately**
- **Document Cr<sup>6+</sup> risks & alternative efforts in PESHE**
- **PEO will certify Cr<sup>6+</sup> on new systems & legacy system modifications/updated maintenance procedures if no alt. exists**

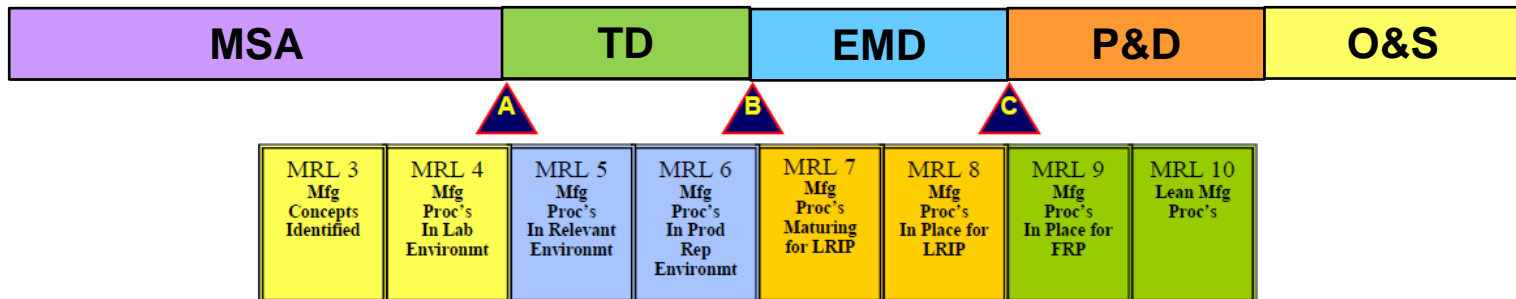


# PEO Certification Details



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- **Cost effectiveness of alternatives vs. Cr<sup>6+</sup>**
- **Technical feasibility of alternatives**
- **ESOH Risk of alternatives vs. Cr<sup>6+</sup>**
- **MRL of at least 8 for alternatives**
- **Materiel availability of alternatives vs. Cr<sup>6+</sup>**
- **Corrosion performance differences as defined by service SMEs (AFCPCO & CTIO)**





# Scope of WNV Cr<sup>6+</sup> Efforts



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- **3010/3020 Funding – directly support the production of aircraft and missiles**
  - Qualification and Validation of COTS
- **Our Cr<sup>6+</sup> efforts are on:**
  - Corrosion Control of aircraft surfaces (Pretreatments, Primers and Coatings)
  - Corrosion Control of fasteners
  - Fuel tanks
  - Sealants



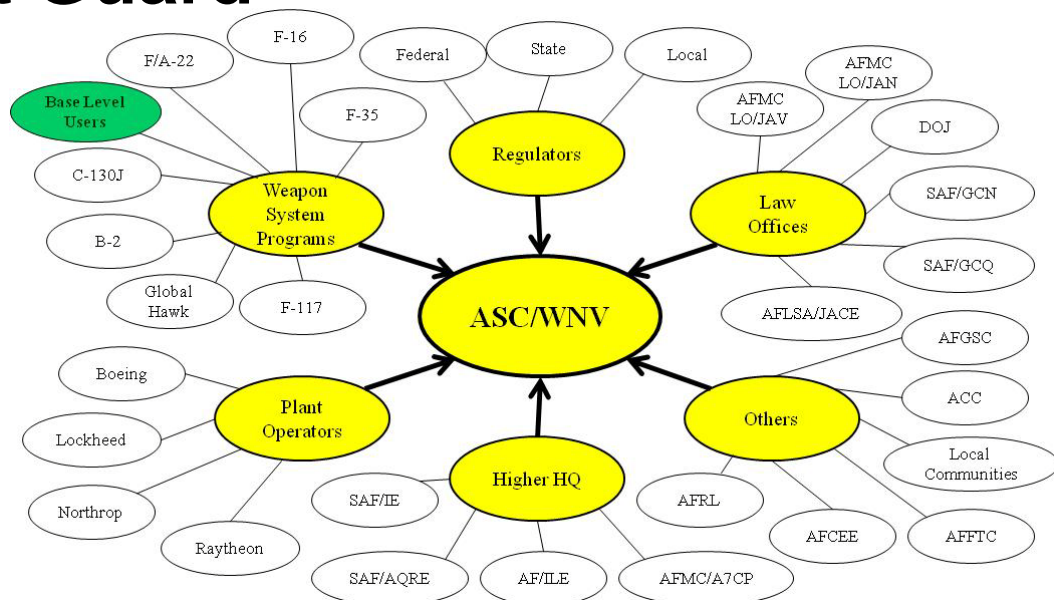


# Other Cr<sup>6+</sup> Alternatives Efforts



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- AFRL/RXSSO (CTIO)
- ALCs and AFCPCO, Robins AFB
- PEWG, Tinker AFB
- Other services such as NAVAIR, Army Aviation and Coast Guard
- Industry
- Academia







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# Status of Cr<sup>6+</sup> on Some of the USAF Legacy Systems

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- **Non-Cr Surface Treatments and Non-Cr Primer**
  - AETC (T-38)
  - WR-ALC (F-15)
  - ACC (F-16) Plan Mg Rich Primer & Non-Cr pre-treatment
  - F-35
- **Non-Cr Surface Treatment (Prekote) and Cr Primer**
  - OO-ALC (C-130, F-16, A-10)
  - AETC (T-6, T-38 and T1A)
- **Both Cr Primers & Non-Cr primers as well as Cr Surface Treatment**
  - F-22

Non-Chrome Tie-coat  
& touch-up primer





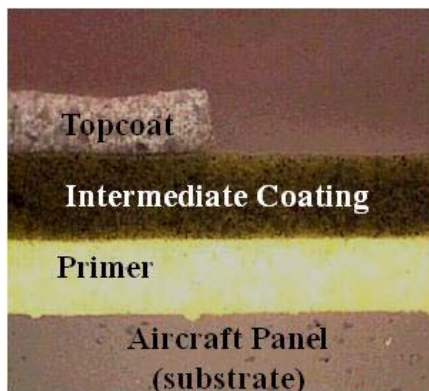
# Current and Past WNV Cr<sup>6+</sup> Efforts



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- **Low-Cr Conversion Coating and NC Primer for C-130J OML**
- **Non-chrome primer – C130J IML**
- **Mg-Rich Treatment**
- **Non-chrome, Low VOC Fuel Tank Coating (Mil Spec AMS-C-27725)**
- **Barrier coat for F-16**



Barrier coat encapsulates chrome primer  
Chrome primer application on F-16



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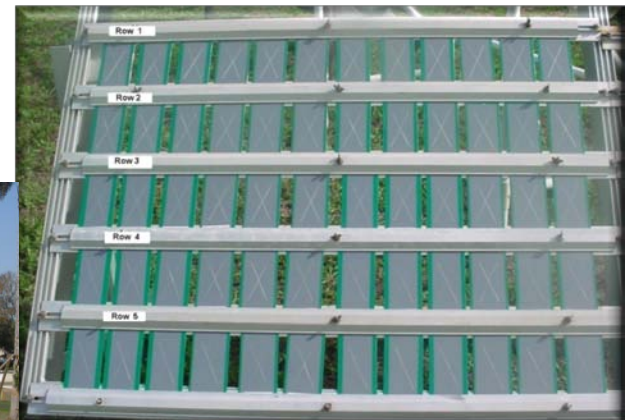
# Just starting WNV Cr<sup>6+</sup> Projects



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- **Non-chrome conversion coating (Touch-up)**
- **Non-chrome conversion coating (Immersion)**
- **Total Non-chrome stack-up C-130J OML**
  
- **Non-Threaded Dry Fastener for wet sealant  
Corrosion Protection**
- **Next Gen Mg-Rich Treatment**

Test Panels at FMRF  
Static A/C (F-106) at FANG





# Lessons Learned

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- **Projects based on P2 needs from GOCO facilities & ASC Program Offices**
- **Projects benefit is on production**
  - may impacts ACLs
- **Projects must have environmental compliance (ESOH driver)**
- **Each weapon system requires Dem/Val of the alternative on their system**
- **OEM “process” change required Qual Testing & OEM Spec changes**



# Lessons Learned Cont'd



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- **Need to insert all Cr<sup>6+</sup> related projects into DoD ASETSdefense database**
  - WNVV has provide summaries of Cr<sup>6+</sup> projects
- **Depend on AFRL, Academia & Commercial entities to mature technologies (TRL 7)**
  - Use ASETSdefense for DoD and Commercial applications
  - DTIC for DoD-related efforts



# Recommendations/Conclusions



- **Need to collaborate with others (e.g., AFRL, OEMs and depots) for future projects to avoid duplication of effort**
- **Some Cr<sup>6+</sup> will be continued to be used:**
  - **Unless the alternatives are equal in corrosion control, have less LCC, are available and have less ESOH risk (as defined by MIL STD 882D)**
  - **Unless Cr<sup>6+</sup> becomes no longer available due to increasing international & US regulations**



# ASC Environmental & Health Risk Mgmt Branch (ASC/WNVV)



## Weapon System Environment & Health Risk Footprint



ASC/WNVV supports System Acquisition Programs in managing these risks ...  
**promoting individual health, & protecting the environment**

